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ABSTRACT

In an attempt to confirm earlier results with a group of mentally retarded females, 12 mentally retarded institutionalized adults (8 male, 4 female) were trained to either reduce (Loud group) or increase (Soft group) their voice volumes with a combination of visual feedback and token reinforcement. The feedback unit provided a binary light on-off signal. Colored lights were used for loud (red), soft (blue), and normal (green) voice volumes, and a digital summary was provided of the total time each light was on. Tokens were given for each trial of 15 sentences with a green light time-on of 70% or better. One-half of the sample received feedback only; the other half was given feedback plus tokens. Results produced a significant improvement in control of voice volume in Loud and Soft groups as measured by the differences in pre- and post- baseline decibel readings (5, 12, and 19 days post-training), cumulative tools of the light readouts, and caseworkers' ratings of each participant. The results confirmed findings on the effectiveness of visual feedback. It is suggested that the use of visual feedback as a training device can be used not only to address voice intensity disorders, but other voice disorders, as well, in this population. (Author/CL)

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SHAPING WITH VISUAL FEEDBACK AND TOKEN REINFORCEMENT: EFFECTS ON VOICE VOLUME CHANGES IN MENTALLY RETARDED ADULTS

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In an attempt to confirm earlier results with a group of mentally retarded females, we trained for two weeks 12 male and female patients residing permanently at Norton State Hospital in Kansas, to either reduce (Loud group) or increase (Soft group) their voice volumes with a combination of visual feedback and token reinforcement. The feedback unit provided a binary light on - off signal through colored lights for loud (red), soft (blue) and normal (green) voice volumes, plus a digital summary of the total time each light was on. Tokens were given for each trial of 15 sentences with a green light time-on of 70% or better. One-half of the sample received feedback only, the other half was given feedback plus tokens. Results produced a significant improvement in control of voice volume in Loud and Soft groups as measured by the differences in pre - and post (five, 12 and 19 days post-training) baseline decibel readings, cumulative totals of the light readouts (the themselves were disconnected during these readings) and caseworkers ratings of each participant. The results confirm our earlier work and extend their implications to other voice disorders in this population.

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SHAPING WITH VISUAL FEEDBACK AND TOKEN REINFORCEMENT: EFFECTS ON VOICE VOLUME CHANGES IN MENTALLY RETARDED ADULTS

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PROBLEM

Two behaviors frequently encountered in institutional settings for the mentally retarded that my hinder sucessful community integration are excessively loud or weak voice volumes (Glen, Nerbonne & Tolhurst, 1978; McNutt & Leri, 1979). Research in this area has shown that the use of operant conditioning procedures have demonstrated positive results in modifying voice intensity disorders in mentally retarded individuals (Allen, 1982; Brody, Nelson & Brody, 1975; Ford & Vetri-Ford, 1980; Holbrook & Meador, 1969; Jackson & Wallace, 1974; Kreitzer, Anchor & Hess; 1971; Lodge & Yarnell, 1981; Michelson & Dilorenzo, 1979; Patterson, Teigen, Lieberman & Austin, 1975; Young, 1981). Young & Gurski (1983) argued that voice volume change can be acquired and maintained by retarded female adults using visual feedback and social reinforcement. The purpose of the present study was to replicate and extend Young (1981) to a hospital population, to evaluate the effectiveness of visual feedback and token reinforcement in producing voice volume changes in mentally retarded adults, and to confirm the results in adults with either too loud or too soft voice volumes.

METHOD

Participants

Twelve mentally retarded adults (8 male, 4 female), ranging in age for 23 to 72 years, with IQ's between 40 and 75, and a reading ability at the first grade level were chosen as participants. They were rated by interdisciplinary team members as among those whose voice volumes were inappropriate (too loud or too soft) and who might benefit from training. Participants were divided into two groups ("Loud" or "Soft") based on their voice volume level during normal conversations.

Apparatus and Materials

The apparatus, which was specially designed for the Young (1981) study, consisted of a voice-activated switch which operates a series of lights to provide feedback about voice volume, as sensed by a microphone connnected to it. A red light indicated the sound level was too loud, a blue light indicated too soft, and a green light indicated optimal sound level. Digital timers attached to the red and green light automatically recorded the length of time each of the lights were on during a given trial. Voice volume in decibels were obtained for baseline and follow-up sessions by using a decibel level meter. Pre- and post-test evaluations by team members were completed for each volunteer.

Procedure

Prior to training, team member evaluations were completed for each particpant. Baseline data were collected by having the participant read through a list of 15 sentences three times with no feedback given. Next, the purpose and goal of training was explained and the apparatus was demonstrated. Three patients from the "Loud" group and three from the "Soft" group received visual feedback and reinforcement in the form of tokens (plastic chips that can be traded for other items). The remaining six patients received visual feedback only. (The criterion for reinforcement was set a 70%. That is, subjects were reinforced with tokens for their ability to keep the green light on 70% of the time for each sentence read.) Twenty training sessions, two sessions per day, with three trials (15 sentences/trial) per session, were given over a two-week period. Three follow-up sessions, identical to the baseline session, were given at five, 12 and 19 days after training was completed. Team member evaluations were gathered on that day of the last follow-up session.

RESULTS

Group means for the Pre- and Post decibel readings are presented in Figure 1. Baseline means for the "Loud" group across trials were 82.5, 84.4, 84.7, 84.5, 85.5, and Follow-up means were 71.6, 71.4, and 71.7. Baseline means for the "Soft" group across trials were 62, 61.9, 62.4, 61.9, 61.8, and Follow-up means were 68, 69, and 67.8, respectively. Voice volume in dB was significantly lower for the "Loud" group (t_5=5.59, p=.002) and significantly higher for the "Soft" group (t_5=-6.75, p=.001) between baseline and 19 day follow-up. Team member evaluations coincide with the voice volume results for both the "Loud" (t_5=3.76, p=.006) and "Soft" (t_5=-5.47, p=.001) groups. Differences in time-on of the green light did not change for the "Loud" group but increased tenfold for the "Soft" group (see Table 1). The "Loud" group red light score showed a substantial decrease from baseline to 19 day follow-up (see Table 2). The use of reinforcement did not produce significant differences in response rates.

DISCUSSION

The present results confirm that visual feedback was effective in increasing or decreasing voice volume in mentally retarded adults. Voice volume changes were acquired and maintained with and without accompanying token reinforcement. This suggests that visual feedback, in the form of lights, was sufficient to sustain interest and motivation during training. Interdisciplinary team member evaluations indicated that voice intensity changes generalized to the ward setting. The use of visual feedback as a training device to address not only voice intensity disorders, but other speech deficits as well, is another area of investigation. The apparatus could be altered to provide corrective feedback during normal volume speech: articulation, intonation, accent and speech patterns.

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TABLE 1

Mean Number of Seconds of Green Light on for Soft and Loud Groups for each trial within a session

Group	Baseline	Training		Follow-up
		1 - 10	11 - 20	
Loud	M=10.75 SD=1.9	M=12.3 SD=2.2	M=10.6 SD=4.0	M=12.0 SD=2.1
Soft	M=.66 SD=1.1	M=4.4 SD=2.3	M=5.9 SD=3.3	M=7.5 SD=3.9

TABLE 2

Mean Number of Seconds of Red Light on for Loud Group for each trial within a session

Group	Baseline	Training		Follow-up
		1 - 10	11 - 20	
Loud	M=6.23 SD=2.6	M=1.0 SD=.42	M=.48 SD=.95	M=.49 SD=1.0

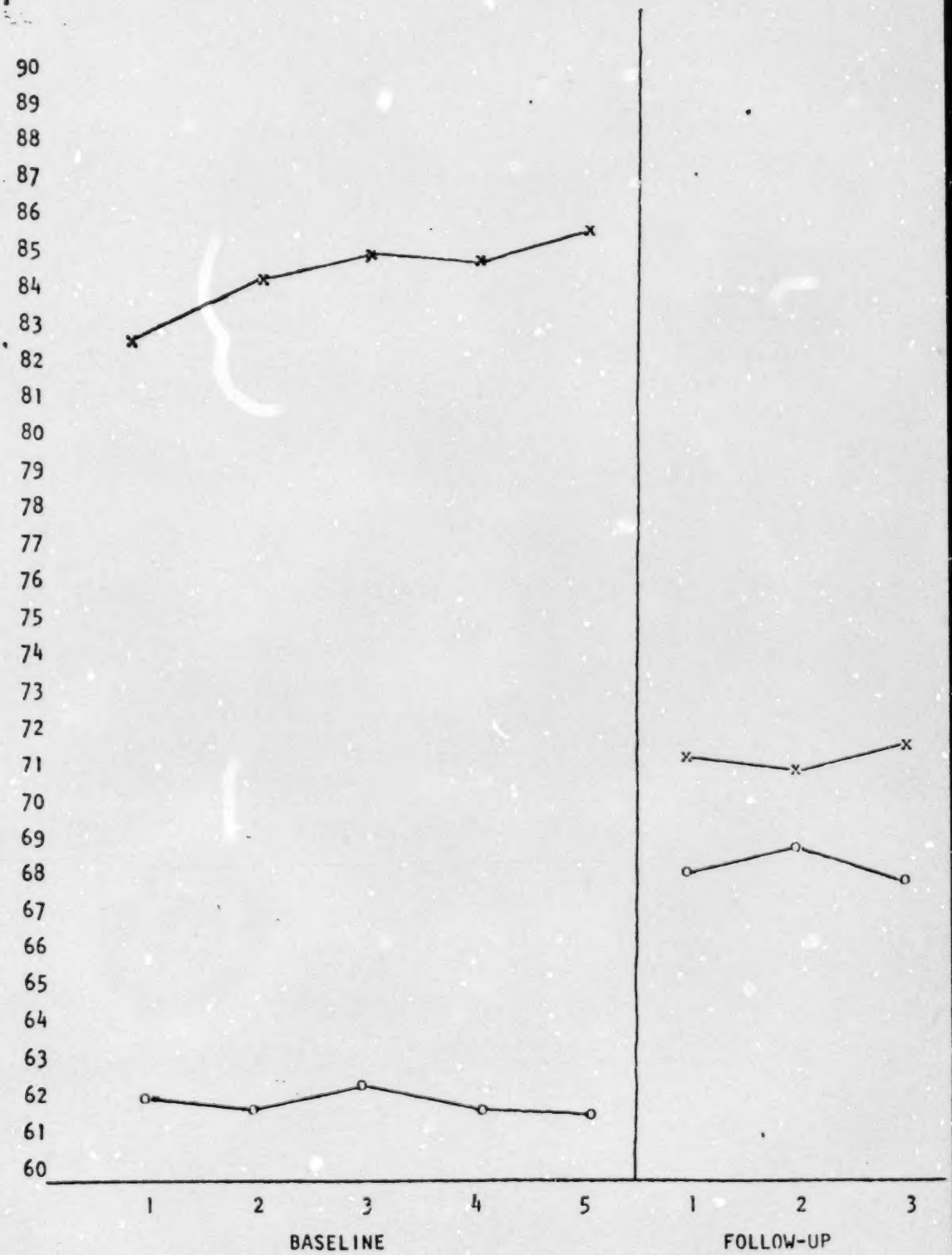

Figure 1. Decibel readings from pre- and post-training baseline trials.

x = Loud Group

o = Soft Group

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